APPLICATION FOR
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FOR

LINE GUIDE

BY:

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BACKGROUND OF THE INVENTION

1. Cross-Reference to Related Applications:

This application is a continuation-in-part of co-pending U.S. patent application Ser. No. 10/104,174, filed on March 22, 2002, which claims the benefit of and priority to U.S. Provisional Patent Application No. 60/277,863 filed March 23, 2001 and U.S. Provisional Patent Application No. 60/286,458, filed April 27, 2001, the technical disclosures of both of which are hereby incorporated herein by reference. This application also claims the benefit of and priority to U.S. Provisional Application No. 60/417,131, filed on October 10, 2002, the technical disclosure of which is hereby incorporated herein by reference..

2. Technical Field:

The present invention relates to an apparatus and method for improving the efficiency of installing refrigeration lines. More particularly, the present invention relates to a bracket guide and method for using same which facilitates a more efficient installation of refrigeration lines between a first and second unit.

3. Description of the Related Art:

The use of refrigerated air conditioning systems in commercial and residential property has become commonplace and ubiquitous. Indeed, particularly in the South and Southwest, it borders on being a necessity for ordinary life. Over the years, a variety of different air conditioning systems have been developed for cooling interior spaces. For example, in particularly arid regions, evaporative coolers are effective air conditioners, while large commercial buildings oftentimes rely upon air conditioning systems commonly known as chilled-water systems. Perhaps the most widely employed air conditioning system used today is what is commonly termed refrigerated air.

Refrigerated air conditioning systems, commonly found in such diverse products as refrigerators, automobiles, and buildings, all operate in accordance with the same

general principals. A refrigerant gas (*e.g.*, Freon) is compressed, causing it to become a hot, high-pressure gas. This hot gas is then directed through a first set of heat exchange coils to dissipate its heat and condense into a liquid. The liquid refrigerant is then directed to an expansion valve wherein it is allowed to evaporate becoming a cold, low pressure gas. This gas is then directed to a second set of heat exchange coils allowing the cold gas to absorb heat and in turn cool down air directed over the second set of coils. The refrigerant gas is then cycled back to the compressor to repeat the process once more.

While all refrigerated air conditioning systems operate in accordance with the same general principals, there are a multitude of specific systems adapted to particular uses. With regard to residential and smaller commercial building applications, one system in particular, commonly known as a "split-system," has become quite prevalent. As its name implies, split-system air conditioners split the "hot" side from the "cold" side of the refrigerated cycle system. The hot side of the system, known as the condensing unit, is placed outside the building and comprises a compressor, heat exchange coil and a fan to disperse the heat generated by the system. The cold side of the system, comprising an expansion valve and evaporator coil, is generally placed in a furnace or some other air circulating device. The air circulating device blows air over the evaporator coil and routes the air throughout the building using a series of ducts.

Because the two components of a split-system air conditioner are remotely located from one another, connecting lines are used to link the two components together. These connecting lines, or refrigeration lines as they are commonly referred to, usually comprise a supply line, a return line, and a voltage control wire. The supply and return lines typically comprise copper tubing and one or both may include a wrapping of insulation (*e.g.*, foam tubing).

Several problems arise during the installation of these refrigeration lines. The refrigeration lines must be laid between an exterior location and an interior location, thereby connecting the condenser unit with the evaporator coil. Consequently, this requires routing the refrigeration lines through an exterior wall and up into an attic or

overhead space where the furnace or other air circulating device is located. Typically, the installation of refrigeration lines comprises forming an access hole in an exterior wall whereby the refrigeration lines can be fed through. Another hole or notch is formed in the vertical top plate allowing access to the overhead space. Special care must be taken when installing the refrigeration lines to ensure they are not damaged during the installation process. While flexible and durable, the copper tubing is prone to crimping. The wrapping of insulation and voltage control wire are also prone to tearing and chaffing. Thus, currently, the installation process usually requires two installers to complete in a satisfactory manner. Typically, one installer, positioned on the ground floor, feeds and routes and the refrigeration line up and through the hole formed in the to another installer located in the overhead space. The installer in the overhead space must carefully bend the refrigeration lines to avoid hitting the pitched roofline. Particular care must be taken throughout the installation process to ensure that the tubing does not crimp and that the insulation or wiring is not torn.

While inherently difficult in new construction where the space between walls is usually accessible, the installation of refrigeration lines is further compounded in retrofit applications to existing housing where the space between walls is usually not easily accessible.

A need, therefore, exists for an improved method and device for installing refrigeration lines which would require only one installer. Further, a need exists for a method and device for improving the efficiency of installing refrigeration lines which is highly adaptable to a variety of building applications. Still further, a need exists for a method and device for improving the efficiency of retrofit installations of refrigeration lines in existing buildings.

SUMMARY OF THE INVENTION

The present invention overcomes many of the disadvantages of prior art refrigeration line installation techniques by providing a line guide which when properly mounted in the horizontal top plate of a structure enables one person to properly install refrigeration lines. The line guide is adaptable to both wood and metal frame construction.

In one embodiment, the line guide has a unitary body comprised of an attachment bracket with a guide tube formed therethrough. The guide tube's axial orientation changes over its length. The guide tube's change in axial orientation may be fixed or variable. In addition, the guide tube may be detachable from the bracket enabling guide tubes of different fixed orientations to be used in combination with the same bracket.

In one embodiment, the line guide comprises a C-shaped bracket configured so as to be mounted in a notch formed in the horizontal top plate. In another configuration, the line guide comprises a U-shaped bracket which actually replaces a gap portion of the horizontal top plate.

In another embodiment, the line guide is adapted to soffit installations for use in retrofit applications. A guide tube is positioned through a hole formed in the soffit of the structure thereby allowing access to the overhead space. Annular bracket fittings help secure the guide tube in the soffit hole.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the method and apparatus of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings, wherein:

FIG. 1*a* is a perspective view of an embodiment of the present invention;

FIG. 1*b* is a perspective view of an attachment bracket in an embodiment of the line guide of the present invention;

FIG. 1*c* is a reverse perspective view of the attachment bracket in an embodiment of the line guide of the present invention;

FIG. 1*d* is a perspective view of a second embodiment of the present invention;

FIG. 1*e* is a perspective view of the attachment bracket of the second embodiment of the line guide of the present invention shown in FIG. 1*d*;

FIG. 1*f* is a perspective view from below of the attachment bracket shown in FIG. 1*e*;

FIG. 1*g* is a perspective view from below of a variant of the attachment bracket shown in FIG. 1*e*;

FIG. 2*a* is a cross-sectional view of a typical frame construction structure illustrating a horizontal top plate installation of an embodiment of the line guide of the present invention;

FIG. 2*b* is a cross-sectional view of a typical frame construction structure illustrating a horizontal top plate installation of the second embodiment of the line guide of the present invention;

FIGS. 3*a*, 3*b*, and 3*c* are side views of alternate variations of an embodiment of the line guide of the present invention;

FIGS. 3*d*, 3*e*, and 3*f* are side views of alternate variations of the second embodiment of the line guide of the present invention.

FIG. 4 is a cross-sectional view of a typical frame construction structure illustrating a soffit installation of an embodiment of the line guide of the present invention;

FIG. 5*a* is a perspective view of an embodiment of the annular bracket fitting used in soffit installations of the line guide of the present invention; and

FIG. 5*b* is a side view of an embodiment of the annular bracket fitting used in soffit installations of the line guide of the present invention.

Where used in the various figures of the drawing, the same numerals designate the same or similar parts. Furthermore, when the terms "top," "bottom," "first," "second," "upper," "lower," "height," "width," "length," "end," "side," "horizontal," "vertical," and similar terms are used herein, it should be understood that these terms have reference only to the structure shown in the drawing and are utilized only to facilitate describing the invention.

DETAILED DESCRIPTION OF THE INVENTION

With reference to **FIG. 1*a***, a perspective view of an embodiment of the line guide **10** of the present invention is shown. The line guide **10** may be constructed either as a unitary piece or as a composite piece comprised of two or more interlocking pieces. The line guide includes a bracket element **12** and a guide tube **14**.

The bracket element **12** is used to attach the line guide **10** to a horizontal top plate. As shown in **FIGS. 1*b*** and **1*c***, the bracket element **12** includes a vertical side **20** bounded by two opposing horizontal pieces **22**, **24** with apertures **26**, **28** formed respectfully therein, and suitable for grasping and aligning the guide tube **14**. In the embodiment shown, the bottom horizontal piece **22** also includes a flange recess **22** formed around aperture **26** wherein one end of the guide tube 14 may be inserted and secured. The bracket element **12** also includes a groove **18** formed in the outer surface of vertical side **20** and suitable for holding a nailing plate **16** which facilitates the installation of the bracket element **12**. The nailing plate **16** may be a separate metal strip or a reinforced area comprised of thicker material. The bracket element **12** may also include pre-formed nail holes or other associated means for facilitating the installation of the bracket element **12**.

The guide tube **14** is comprised of a length of tubing with a sufficient inner diameter to allow the refrigeration lines to easily move within its confines. The interior surface of guide tube **14** is generally smooth and may, in addition, be coated with a friction reducing compound. The outer diameter of the guide tube **14** is adapted to fit the apertures **26** and **28**, formed in the bracket element. The guide tube **14** also includes a bend **15** that smoothly changes the axial orientation of the guide tube **14**.

Referring now to **FIG. 2*a***, the present invention is intended for use in the buildings of the type having conventional upstanding walls, such as the one shown at **50**, which includes vertical studs **52** connected by a horizontal top plate **54**. A roof **56** for the building is made up of roof framing members which include horizontal ceiling joists **58** and roof rafters **60** which incline upwardly from the ceiling joists **58**. Ceiling means **62**

(*e.g.* dry wall or plywood) is fixed to the underside of the joists **58**, while roof sheathing **64** is fixed to the top side of rafters **60**. The wall board **62** and roof sheathing **64** define an attic or upper space **70** for the building.

The ceiling joists **58** and roof rafters **60** come together and are secured in the area of the wall top plate **54**. The roof rafters **60** extend beyond the wall top plate **54** and form eaves, such as the one shown at **66**. As is conventional, the eave **66** is hollow and is covered along the bottom by sheathing which forms the soffit **68** and along its side by a fascia board **72** that is oriented perpendicular to the soffit **68**.

The attic or upper space **70** and the hollow eaves **66** are connected by openings defined between the roof framing members, and specifically between adjacent pairs of ceiling joists **58** and roof rafters **60**, the wall top plate **54** and the roof sheathing **64**.

As shown in **FIG. 2*a***, the indoor unit **80** of a split-system air conditioner (*i.e.*, the evaporator coil and expansion valve) is commonly placed in the attic or upper space **70** of a building. As previously mentioned, the condensing unit (not shown), is usually placed on the exterior of the building. In order to connect the two systems in the conventional manner, a line guide **10** of the present invention is installed in the horizontal top plate **54** thereby allowing the attic or upper space **70** of the building to be more easily accessed from below.

The line guide **10** is installed by cutting a suitably sized notch in the horizontal top plate **54** and securing the line guide **10** into the notch such that the inner surface of the vertical side **20** of the bracket element **12** is generally adjacent to and parallel with the vertical sides of the horizontal top plate **54** and the opposing horizontal pieces **22** and **24** of the bracket element **12** are disposed on the bottom and top horizontal surfaces of the horizontal top plate **54**. The line guide **10** is thereupon securely fastened to the horizontal top plate **54** using any suitable fastening means (*e.g.*, nails, screws, rivets, or adhesives).

In the embodiment shown in **FIG. 2*a***, the guide tube **14** of line guide **10** includes a preformed bend which smoothly changes the axial orientation of the guide tube **14** from

generally vertical at its lower end to an orientation which is generally parallel to the incline of the roof **56**.

Once installed in the manner illustrated in **FIG. 2*a***, the line guide **10** enables a single installer to complete the installation of the refrigeration lines. In the typical installation, an installer will bundle the refrigeration lines (*i.e.*, the supply and return line **82, 84** and the voltage control wire **86**) into a single combined line. The installer then threads the combined refrigeration lines up and through the guide tube **14** of line guide **10** and into the attic or upper space **70** . The smooth change in the axial orientation of the guide tube **14** gently redirects the angular orientation of the refrigeration lines such that the lines are gently bent without crimping. Additionally, the smooth interior surface of guide tube **14** prevents the insulation layer on any of the refrigeration lines from chaffing being torn. Once a sufficient length of refrigeration line has been pushed up into the attic or upper space **70** to generally hold the refrigeration line in place, the installer may reposition to the attic or upper space **70** where the combined refrigeration line may be pulled the rest of the length.

Referring now to **FIGS. 3*a***, **3*b***, and **3*c***, alternate variants of the embodiment of the line guide **10** are illustrated. **FIG. 3*a*** illustrates a line guide **10** which has a unitary body comprised of an attachment bracket **12** with a guide tube **14** formed therein. The guide tube **14** includes a fixed preformed bend **15** which smoothly changes the axial orientation of the guide tube **14** over its length. It is understood that numerous variations of this variant of the embodiment of line guide **10** may be constructed, each with a distinct and fixed preformed bend **15**.

FIG. 3*b* illustrates a line guide **10a** comprised of an attachment bracket **12a** and a detachable guide tube section **14a**. The guide tube section **14a** includes a fixed preformed bend **15a** which smoothly changes the axial orientation of the guide tube **14a** over its length. However, because the guide tube section **14a** is detachable, a variety of guide tube sections with distinct and fixed preformed bends **15a** can be used in combination with the same attachment bracket **12a**. The guide tube section **14a** may be affixed to the

attachments bracket **12a** by any suitable conventional means (*e.g.*, friction fitting, adhesive gluing, opposing screw threads, rivets or screws).

FIG. 3*c* illustrates a line guide **10b** which may have either a unitary or composite body comprised of an attachment bracket **12b** and a guide tube **14b**. The guide tube **14b** of this variant includes a pull-out flexible convoluted section **14b'** similar in principle to those found in conventional flexible drinking straws. The convoluted section **14b'** may adjusted as necessary to obtain the desired change in axial orientation over its length. While, perhaps, not as rigid as the variants comprising preformed bends in the guide tube, the convoluted section **14b'** allows the guide tube **14b** the flexibility to be formed into an infinite number of changes in axial orientation over its length. As mentioned previously, the utility of the pull-out flexible convoluted section **14b'** illustrated in **FIG. 3*c*** may be combined with the utility of the variant illustrated in **FIG. 3*b***. Thus, a further variation of the a line guide **10a** illustrated in **FIG. 3*b*** may further comprise a pull-out flexible convoluted section **14b'** formed in the detachable guide tube section **14a**.

As noted previously, the bracket element **12** is designed to position and secure the line guide **12** in a suitably sized notch formed in the horizontal top plate **54**. While the bracket element **12** may be sized to accommodate any size of guide tube **14**, in some instances the size of the refrigeration lines necessitates the use of a guide tube **14** with a diameter so large that all or almost all of the horizontal top plate **54** must be removed. For example the use of larger copper refrigerant lines due to refrigerant and efficiency changes, as well as increases in the size of insulation used to cover refrigeration lines necessitates the use of larger guide tubes **14**. While the embodiment of the present invention shown in **Fig. 1*a***, may be sized to accommodate a guide tube **14** having a diameter as large as the lateral width of the horizontal top plate **54**, in such instances it may be desirable to replace or strengthen the structural integrity of the breached horizontal top plate **54**. Thus, as depicted in **FIG. 1*d***, a perspective view of another embodiment of the line guide **10A** of the present invention is shown which includes an alternate bracket element **12A** having enhanced strength characteristics.

As with the previously described embodiment of the present invention, this embodiment of the line guide **10A** may be constructed either as a unitary piece or as a composite piece comprised of two or more interlocking pieces. This line guide **10A** includes the alternate bracket element **12A** and utilizes the same guide tube **14** as described previously.

As shown in **FIGS. 1*e*, 1*f*,** and **1*g***, the alternate bracket element **12A** comprises a horizontal plate **20A** having an aperture **26A** formed therethrough, and bounded by two opposing planar side pieces **22A, 24A**, which are arranged generally perpendicular to the horizontal plate **20A**. The aperture **26A** may be oval, circular, or any shape necessary to accommodate the guide tube **14**. In the embodiment shown **FIG. 1*g***, the aperture **26A** in the bottom horizontal piece **20A** may include a flange **27** formed around aperture **26A** wherein one end of the guide tube **14** may be inserted and secured. The alternate bracket element **12A** may also include a series of pre-formed nail holes **a**, **b**, **c** and/or other associated means for facilitating the installation of the alternate bracket element **12A**.

As noted above, the second embodiment line guide **10A** uses essentially the same guide tube **14** utilized with the first embodiment. Thus, the guide tube **14** of line guide **10A** is comprised of a length of tubing with a sufficient inner diameter to allow the refrigeration lines to easily move within its confines. The interior surface of guide tube **14** is generally smooth and may, in addition, be coated with a friction reducing compound. The outer diameter of the guide tube **14** is adapted to fit through the aperture **26** formed in the alternate bracket element **12A**. The guide tube **14** also includes a bend **15** that smoothly changes the axial orientation of the guide tube **14**.

Referring now to **FIG. 2*b***, the line guide **10A** is also intended for use in the buildings of the type having conventional upstanding walls, such as the one shown at **50**, which includes vertical studs **52** connected by a horizontal top plate **54**. A roof **56** for the building is made up of roof framing members which include horizontal ceiling joists **58** and roof rafters **60** which incline upwardly from the ceiling joists **58**. Ceiling means **62** (*e.g.* dry wall or plywood) is fixed to the underside of the joists **58**, while roof sheathing

64 is fixed to the top side of rafters 60. The wall board 62 and roof sheathing 64 define an attic or upper space 70 for the building.

The ceiling joists 58 and roof rafters 60 come together and are secured in the area of the wall top plate 54. The roof rafters 60 extend beyond the wall top plate 54 and form eaves, such as the one shown at 66. As is conventional, the eave 66 is hollow and is covered along the bottom by sheathing which forms the soffit 68 and along its side by a fascia board 72 that is oriented perpendicular to the soffit 68.

The attic or upper space 70 and the hollow eaves 66 are connected by openings defined between the roof framing members, and specifically between adjacent pairs of ceiling joists 58 and roof rafters 60, the wall top plate 54 and the roof sheathing 64.

As shown in **FIG. 2*b***, the indoor unit 80 of a split-system air conditioner (*i.e.*, the evaporator coil and expansion valve) is commonly placed in the attic or upper space 70 of a building. As previously mentioned, the condensing unit (not shown), is usually placed on the exterior of the building. In order to connect the two systems in the conventional manner, a line guide 10A of the present invention is installed in the horizontal top plate 54 thereby allowing the attic or upper space 70 of the building to be more easily accessed from below.

The line guide 10A is installed by cutting a suitably sized notch in the horizontal top plate 54 and securing the line guide 10A in the notch. It is understood that the notch may be of such a dimension as to create an actual gap in the horizontal top plate 54. The line guide 10A is installed by raising it into position such that the inner surface of horizontal plate 20A is adjacent to the bottom horizontal surface of the horizontal top plate 54 and the inner surfaces of the two opposing planar side pieces 22A, 24A are generally adjacent to and parallel with the vertical sides of the horizontal top plate 54. The line guide 10A is thereupon securely fastened to the horizontal top plate 54 using any suitable fastening means (*e.g.*, nails, screws, rivets, or adhesives). For example, the line guide 10A may be tacked into place using pre-formed nail holes c through the horizontal plate 20A, whereupon suitably sized nails may be hammered through the series of pre-

formed nail holes formed through the sides of the two opposing planar side pieces **22A**, **24A** (*e.g.*, **a**, **b**), thereby securing the line guide **10A** to the horizontal top plate **54**.

As with the first embodiment, the guide tube **14** of the line guide **10A** shown in **FIG. 2*b*** includes a preformed bend which smoothly changes the axial orientation of the guide tube **14** from generally vertical at its lower end to an orientation which is generally parallel to the incline of the roof **56**.

Once installed in the manner illustrated in **FIG. 2*b***, the line guide **10A** enables a single installer to complete the installation of the refrigeration lines. In the typical installation, an installer will bundle the refrigeration lines (*i.e.*, the supply and return line **82**, **84** and the voltage control wire **86**) into a single combined line. The installer then threads the combined refrigeration lines up and through the guide tube **14** of line guide **10A** and into the attic or upper space **70** . The smooth change in the axial orientation of the guide tube **14** gently redirects the angular orientation of the refrigeration lines such that the lines are gently bent without crimping. Additionally, the smooth interior surface of guide tube **14** prevents the insulation layer on any of the refrigeration lines from chaffing being torn. Once a sufficient length of refrigeration line has been pushed up into the attic or upper space **70** to generally hold the refrigeration line in place, the installer may reposition to the attic or upper space **70** where the combined refrigeration line may be pulled the rest of the length.

Referring now to **FIGS. 3*d***, **3*e***, and **3*f***, alternate variants of the embodiment of the line guide **10A** are illustrated. **FIG. 3*d*** illustrates a line guide **10A** which has a unitary body comprised of an attachment bracket **12A** with a guide tube **14** formed therein. The guide tube **14** includes a fixed preformed bend **15** which smoothly changes the axial orientation of the guide tube **14** over its length. It is understood that numerous variations of this variant of the embodiment of line guide **10A** may be constructed, each with a distinct and fixed preformed bend **15**.

FIG. 3*e* illustrates a line guide **10A'** comprised of an attachment bracket **12 A'** and a detachable guide tube section **14a**. The guide tube section **14a** includes a fixed

preformed bend **15a** which smoothly changes the axial orientation of the guide tube **14a** over its length. However, because the guide tube section **14a** is detachable, a variety of guide tube sections with distinct and fixed preformed bends **15a** can be used in combination with the same attachment bracket **12 A'**. The guide tube section **14a** may be affixed to the attachments bracket **12 A'** by any suitable conventional means (*e.g.*, friction fitting, adhesive gluing, opposing screw threads, rivets or screws).

FIG. *3F* illustrates a line guide **10A"** which may have either a unitary or composite body comprised of an attachment bracket **12 A"** and a guide tube **14b**. The guide tube **14b** of this variant includes a pull-out flexible convoluted section **14b'** similar in principle to those found in conventional flexible drinking straws. The convoluted section **14b'** may adjusted as necessary to obtain the desired change in axial orientation over its length. While, perhaps, not as rigid as the variants comprising preformed bends in the guide tube, the convoluted section **14b'** allows the guide tube **14b** the flexibility to be formed into an infinite number of changes in axial orientation over its length. As mentioned previously, the utility of the pull-out flexible convoluted section **14b'** illustrated in **FIG.** *3f* may be combined with the utility of the variant illustrated in **FIG.** *3e*. Thus, a further variation of the a line guide **10A'** illustrated in **FIG.** *3e* may further comprise a pull-out flexible convoluted section **14b'** formed in the detachable guide tube section **14a**.

Thus, as best shown in a comparison of **FIGS.** *3a-3f*, the first embodiment of the line guide **10** comprises a C-shaped bracket element **12** having a guide tube **14** formed therethrough, the second embodiment of the line guide **10** comprises a U-shaped bracket element **12A** having the guide tube **14** formed therethrough the two horizontal. Whereas the C-shaped bracket element **12** includes only a single vertical side **20** bounded two opposing horizontal pieces **22**, **24**, the U-shaped bracket element **12A** includes two vertical sides **22A**, **24A**, bounding a single horizontal plate **20A**. Thus, in accordance with basic engineering principles, the design of the alternate bracket element **12A** is inherently stiffer to vertical loads along its longitudinal length than the bracket element **12** of the

first embodiment of the line guide **10**. This allows an installer of the present invention to utilize all of the lateral space in a horizontal top plate of a frame wall, while restoring any structural integrity lost due to forming a notch in the top plate.

Referring now to **FIG. 4**, an alternate embodiment of the line guide **110** is illustrated which is adapted for use in retrofit applications. This embodiment of the present invention is also intended for use in buildings of the type having conventional upstanding walls as described previously and illustrated in **FIG. 2**. However, in retrofit applications, the problems associated with installing refrigeration lines are further compounded by the restricted access to interior wall spaces. Typically, interior walls **90** and exterior walls **92** prevent easy access to interior wall spaces. Thus, the installation of refrigeration lines through the horizontal top plate **54**, as discussed previously, is oftentimes not practicable in retrofit applications.

The alternate embodiment of the line guide **110** comprises a guide tube **114** and two annular bracket fittings **112**. The guide tube **114** is similar in every respect to the guide tube **14** of the previously discussed embodiment of the line guide **10**. As shown in one embodiment illustrated in **FIGS. 5*a*** and **5*b***, the annular bracket fittings **112** are designed to fit snugly over one end of the guide tube and hold the guide tube securely in place.

The alternate embodiment of the line guide **110** is installed by cutting a suitably sized hole in the soffit **168** and positioning the guide tube **114** in the hole such that the exit end of the guide tube is able access the attic or overhead space **70** via the hollow eave **66**. The two annular bracket fittings **112** are coaxially positioned on the guide tube **114**, one on the exterior of the soffit **168** and one on the interior of the soffit **168**. The annular bracket fittings **112**, and consequently the line guide **110**, are thereupon securely fastened to soffit **168** using any suitable fastening means (*e.g.*, compression fittings, opposing screw threads, screws, nails, rivets, or adhesives).

Once installed in the manner illustrated in **FIG. 4**, the line guide **110** also enables a single installer to complete the installation of the refrigeration lines in a manner similar

to that specified previously. It is also understood that all of the alternate variants of the embodiment of the line guide **10** disclosed previously, and illustrated in **FIGS. 3*a***, ***3b***, and **3*c***, are also applicable to the alternate embodiment of the line guide **110**.

It is further understood that the present invention may be formed out of any suitable thermoplastic or composite material. Indeed, certain Ultra High Molecular Weight (UHMW) plastic materials with self-lubricating properties might be particularly suited to certain applications.

It will now be evident to those skilled in the art that there has been described herein an improved apparatus and method for improving the efficiency of installing refrigeration lines. Although the invention hereof has been described by way of a preferred embodiment, it will be evident that other adaptations and modifications can be employed without departing from the spirit and scope thereof. For example, while the illustrations depict a single story building, the principals discussed with respect to the use and employment of the present invention are equally applicable to multistoried buildings. Similarly, while the illustrations depict the condensing unit being located below the evaporator coil, it is understood that, especially in light commercial applications, the condensing unit may be positioned above the evaporator coil (*e.g.*, on the roof of the building). The terms and expressions employed herein have been used as terms of description and not of limitation; and thus, there is no intent of excluding equivalents, but on the contrary it is intended to cover any and all equivalents that may be employed without departing from the spirit and scope of the invention.